42. (New) The method of claim 39, wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

43. (New) The method of claim 39, wherein forming the optical fiber comprises forming the cladding layer of silicon oxide, and forming the core of a material having an index of refraction that is greater than the index of refraction of the cladding layer.

44. (New) The method of claim 39, wherein forming the optical fiber comprises forming the cladding layer of aluminum oxide, and forming the core of a material having an index of refraction that is greater than the index of refraction of the cladding layer.

45. (New) The method of claim 39, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

46. (New) The method of claim 45, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

47. (New) The method of claim 39, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

48. (New) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a semiconductor substrate;

forming a second functional circuit on a second surface of the semiconductor substrate, the second surface of the semiconductor substrate being opposite the first surface;

forming a hole through the semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber.

49. (New) The method of claim 48, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the semiconductor substrate, and performing an anode etch of the semiconductor substrate such that the hole is formed at the location of the etch pit.

50. (New) The method of claim 48, wherein forming the optical fiber comprises forming the cladding layer so as to surround the core, the cladding layer having a first index of refraction, and the core having a second index of refraction that is greater than the first index of refraction.

51. (New) The method of claim 48, wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

52. (New) The method of claim 48, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

53. (New) The method of claim 52, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

54. (New) The method of claim 48, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

55. (New) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate;
forming a second functional circuit on a first surface of a second semiconductor substrate;
forming a hole through the first semiconductor substrate;
bonding the first and the second semiconductor substrates together;
forming an optical fiber having a cladding layer and a core in the hole; and
interconnecting the first and the second functional circuits together via the optical fiber.

56. (New) The method of claim 55, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the first semiconductor substrate, and performing an anode etch of the first semiconductor substrate such that the hole is formed at the location of the etch pit.

57. (New) The method of claim 55, wherein forming the optical fiber comprises forming the cladding layer so as to surround the core, the cladding layer having a first index of refraction, and the core having a second index of refraction that is greater than the first index of refraction.

58. (New) The method of claim 55, wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

59. (New) The method of claim 55, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

60. (New) The method of claim 59, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

61. (New) The method of claim 55, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

62. (New) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a first hole through the first semiconductor substrate;

forming a second hole through the second semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the second surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the first and the second holes; and

interconnecting the first and the second functional circuits together via the optical fiber.

63. (New) The method of claim 62, wherein forming the first hole includes forming an etch pit at a selected location of the first surface of the first semiconductor substrate and performing an anode etch of the first semiconductor substrate to form the first hole at the location of the etch pit, and forming the second hole includes forming a second etch pit at a selected location of the first surface of the second semiconductor substrate and performing an anode etch of the second semiconductor substrate to form the second hole at the location of the second etch pit.

64. (New) The method of claim 62, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

65. (New) The method of claim 64, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

66. (New) The method of claim 62, further comprising lining the first and the second holes with a reflecting mirror prior to forming the cladding layer.

67. (New) The method of claim 62, wherein bonding the first and the second semiconductor substrates is performed such that the first hole and the second hole are in alignment.

68. (New) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the

first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a hole through the first semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the first surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber.

69. (New) The method of claim 68, wherein forming the hole includes forming an etch pit at a selected location of the first surface of the first semiconductor substrate, and performing an anode etch of the first semiconductor substrate to form the hole at the location of the etch pit.

70. (New) The method of claim 68, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

71. (New) The method of claim 70, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

72. (New) The method of claim 68, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

73. (New) An electronic system, comprising:

a semiconductor substrate having a hole therethrough;

a first functional circuit on a first surface of the semiconductor substrate;

an optical fiber in the hole, the optical fiber having a cladding layer and a core, the optical fiber also having a first end and a second end;

an optical transmitter located at the first end of the optical fiber; and

an optical receiver located at the second end of the optical fiber;

wherein the optical transmitter and the optical receiver are configured to transmit optical signals through the semiconductor substrate between the first and a second functional circuit.

74. (New) The system of claim 73, wherein the optical transmitter and the optical receiver are configured to transmit the optical signals from the first to the second functional circuit.

75. (New) The system of claim 73, wherein the optical transmitter and the optical receiver are configured to transmit the optical signals from the second to the first functional circuit.

76. (New) The system of claim 73, wherein the cladding layer surrounds the core, and a first index of refraction of the core is greater than a second index of refraction of the cladding layer.

77. (New) The system of claim 73, wherein the core of the optical fiber has a core hole that runs substantially along the center of the optical fiber.

78. (New) The system of claim 73, further comprising a reflecting mirror lining the hole.

79. (New) An electronic system, comprising:

a semiconductor substrate having a hole therethrough;

a first functional circuit on a first surface of the semiconductor substrate;

a second functional circuit on a second surface of the semiconductor substrate, the second surface of the semiconductor substrate being opposite the first surface;

an optical fiber in the hole, the optical fiber having a cladding layer and a core, the optical fiber also having a first end and a second end;

an optical transmitter located at the first end of the optical fiber; and

an optical receiver located at the second end of the optical fiber;

wherein the optical transmitter and the optical receiver are configured to transmit optical signals through the semiconductor substrate between the first and the second functional circuits.

80. (New) An electronic system, comprising:

a first semiconductor substrate having a hole therethrough;

a second semiconductor substrate bonded to the first semiconductor substrate;

a first functional circuit on a first surface of the first semiconductor substrate;

a second functional circuit on a first surface of the second semiconductor substrate;

an optical fiber in the hole, the optical fiber having a cladding layer and a core, the optical fiber also having a first end and a second end;

an optical transmitter located at the first end of the optical fiber; and

an optical receiver located at the second end of the optical fiber;

wherein the optical transmitter and the optical receiver are configured to transmit optical signals through the first semiconductor substrate between the first and second functional circuits.

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81. (New) An electronic system, comprising:

a first semiconductor substrate having a first hole therethrough, the first semiconductor substrate also having a first surface and a second surface opposite the first surface;

a second semiconductor substrate having a second hole therethrough, the second semiconductor substrate also having a first surface and a second surface opposite the first surface, wherein the second surface of the first semiconductor substrate is bonded to the second surface of the second semiconductor substrate;

a first functional circuit on the first surface of the first semiconductor substrate;

a second functional circuit on the first surface of the second semiconductor substrate;

an optical fiber in the first and the second holes, the optical fiber having a cladding layer and a core, the optical fiber also having a first end and a second end;

an optical transmitter located at the first end of the optical fiber; and

an optical receiver located at the second end of the optical fiber;

wherein the optical transmitter and the optical receiver are configured to transmit optical signals through the first and the second semiconductor substrates between the first and the second functional circuits.

82. (New) An electronic system, comprising:

a first semiconductor substrate having a hole therethrough, the first semiconductor substrate also having a first surface and a second surface opposite the first surface;

a second semiconductor substrate having a first surface and a second surface opposite the first surface, wherein the second surface of the first semiconductor substrate is bonded to the first surface of the second semiconductor substrate;

a first functional circuit on the first surface of the first semiconductor substrate;

a second functional circuit on the first surface of the second semiconductor substrate;

an optical fiber in the hole, the optical fiber having a cladding layer and a core, the optical fiber also having a first end and a second end;

an optical transmitter located at the first end of the optical fiber; and

an optical receiver located at the second end of the optical fiber;

wherein the optical transmitter and the optical receiver are configured to transmit optical signals through the first semiconductor substrate between the first and second functional circuits.